



A new AI-powered teaching and learning ecosystem for TVET

Transforming a university-wide teaching platform into an integrated AI-supported environment for teachers and learners

Promising Practice

Implemented by: Shenzhen Polytechnic University (SZPU)

Where: Shenzhen, China

Status: January 2025 – ongoing

Summary: Building on its existing i-Study platform, SZPU embedded AI across the teaching process to personalize learning, improve teaching efficiency and strengthen educational management.

Overview

As TVET institutions increasingly seek to integrate artificial intelligence (AI) into teaching and learning, a key challenge is moving beyond standalone AI tools toward institution-wide approaches that effectively support the learning process. The AI-enabled transformation of Shenzhen Polytechnic University's (SZPU) existing i-Study platform provides a comprehensive example of such an approach. The initiative embedded AI capabilities by integrating AI models, developing AI agents and incorporating AI tools throughout the teaching process.

Established in 1993, SZPU is a public higher TVET institution in Shenzhen and a UNEVOC Centre. It offers bachelor's degrees and higher TVET diploma programmes. The university has consistently ranked among China's leading TVET institutions and serves as a pioneer in TVET innovation, a hub for applied research and development and industry collaboration with small and medium-sized enterprises and leading companies, a centre for lifelong learning, and a training base for TVET educators.

Description

The SZPU i-Study platform is a university-wide platform integrating teaching, learning, management, assessment and learning resources for blended online and offline teaching and learning. It has demonstrated reliable operation and growing engagement, supporting more than 10,000 courses, with peak daily usage exceeding 700 teachers and 24,000 students. In 2025, comprehensive AI capabilities based on general-purpose and education-specific AI models were fully deployed, providing AI workspaces for courses, supporting course-specific knowledge bases and intelligent retrieval, deploying AI teaching assistants and learning companions, and integrating AI lesson planning, test generation and courseware development.

Implementation proceeded in phases. The first phase established foundational services, including data infrastructure, AI model training and management, conversational AI and text generation capabilities. Subsequent phases introduced AI-assisted tools for teachers, such as AI-generated courseware, lesson plans, test-question generation, essay grading and image generation. New tools for students included study reminders and AI-supported Q&A with source traceability. The initiative also developed course knowledge graphs integrating micro-lectures, question relationships and knowledge-point management. In parallel, classroom video recordings were enhanced with AI-powered analysis, including speech recognition, subtitle translation, video management and word cloud analytics.

Key components of the platform

- **Hybrid cloud architecture for security and scalability:** Adopts a hybrid cloud deployment model that balances data security with elastic expansion, integrating with campus identity authentication, academic administration, data sharing and unified service portals.
- **Dual-model AI integration:** Integrates both general-purpose and education-specific AI models, generating course-specific knowledge bases for AI teaching assistant and learning companion agents.
- **AI-powered instructional design agents:** Develops AI lesson planning and content expansion agents embedded directly into online course construction.
- **Embedded AI tools:** Integrates AI test generation, AI-generated courseware and other capabilities directly into online courses.
- **Smart classroom broadcasting:** Enables speech recognition, bilingual subtitles and knowledge point indexing for multi-stream classroom recordings, along with personalized resource recommendations and review of incorrect answers.

Figure 1. AI applications in the SZPU i-Study platform

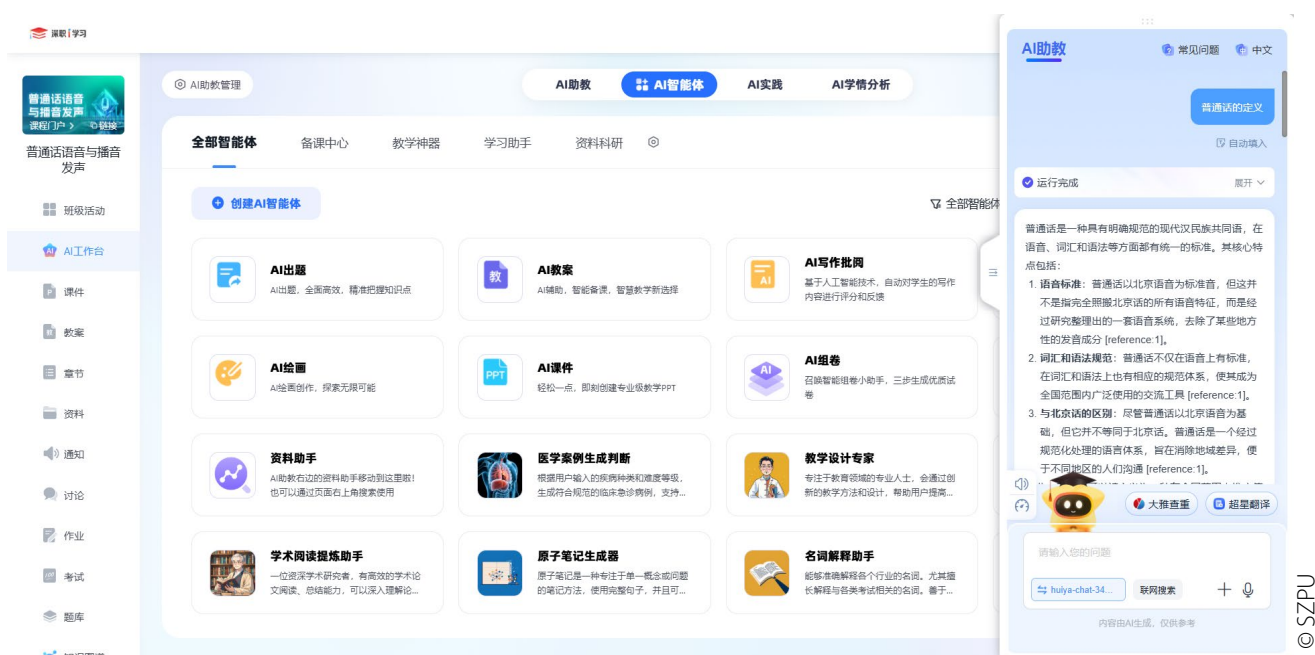


Figure 2. Example of a course knowledge graph in the SZPU i-Study platform



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Outcomes and impact

Quantitative results

Within the first five months of the AI pilot, AI workspaces were made available to more than 3,000 courses; over 500 courses generated AI knowledge bases; and more than 100 courses developed AI-based knowledge graphs.

Qualitative outcomes

For teachers, AI-assisted lesson planning, courseware generation, test creation and automated essay grading have helped reduce routine lesson preparation and grading tasks. Knowledge graphs, optimized question banks and intelligent analytics have strengthened teaching management and enabled teachers to monitor student learning progress more quickly and accurately.

For students, the initiative has created a more personalized and flexible learning experience through tailored resource recommendations, learning progress tracking, real-time Q&A, lecture playback, keyword search, learning prompts and AI teaching assistants. Course-specific AI models and tools provide AI support that is more closely aligned with course content and learning needs.

At the institutional level, the initiative has promoted the co-creation and sharing of high-quality digital teaching resources, expanded student learning spaces and fostered autonomous learning.

Insights and challenges

Challenges

Deploying AI models to support teaching across a large number of courses required careful planning to address computing capacity and data storage needs. The transition from traditional teaching models to AI-enabled approaches also presented challenges related to mindsets and pedagogical perceptions. In addition, ensuring the reliability of AI-generated content and preventing over-reliance on AI emerged as further challenges.

Responses to challenges

- **Hybrid cloud deployment:** The platform adopts a hybrid cloud architecture that enables interoperability with campus teaching systems while keeping teaching resources and data on the university's private cloud

and system support services on the public cloud. On this basis, computing power support, AI model services and AI tool integration are all procured as services and integrated into the SZPU i-Study platform.

- **Lowering adoption barriers:** The initiative promotes AI adoption through intuitive user interfaces, regular training on AI concepts and platform use, real-time online support and continuous platform optimization based on user feedback.
- **Ensuring content quality:** The initiative continuously enhances multimedia analysis capabilities to enrich course knowledge bases and improve the accuracy of AI responses, while strengthening AI usage analytics to detect abnormal application patterns and support quality assurance.

Lessons learned

- **Strengthen deep integration across campus systems to break down information silos:** TVET institutions often operate separate systems for identity authentication, academic administration and data sharing. The initiative established unified data standards, open API directories and compatibility with existing campus systems, enabling seamless integration, single sign-on and real-time data synchronization. It highlights the importance of coordinating early with institutional IT departments to define integration requirements and data standards, avoiding costly rework.
- **Build an integrated technology-service-security framework:** The initiative uses hybrid cloud deployment to balance data security with elastic scalability, supported by compliance with national cybersecurity protection requirements, tiered vulnerability management and comprehensive on-site and remote operational support. Smart platform development must prioritize technical development, long-term operations services and security compliance planning.
- **Commit to iterative optimization with user**

participation: Project design should emphasize user experience through compatibility with common browsers and mobile devices, supported by online guidance and documentation. Continuous feedback from teachers and students enables rapid functional iteration and optimization to avoid developing systems that remain underused and to ensure that intelligent platforms deliver real value for teaching and learning.

Conclusion and next steps

- **Deepening AI functionality: from basic enablement to more targeted support.** Future developments will focus on building a “general-purpose + domain-specific” AI model architecture by integrating the university’s self-developed AI models with domain-specific models for TVET, enabling cross-model knowledge verification and more tailored functions for specific programmes. Personalization will also be strengthened through optimized recommendation algorithms and expanded AI-assisted grading, generating more precise feedback and competency development pathways.
- **Expanding teaching scenarios: from classroom focus to full coverage.** SZPU plans to integrate AR and AI technologies to support immersive virtual training and simulation for high-risk or high-cost training scenarios. It will also develop cross-language teaching modules with real-time translation of technical documents and

foreign textbooks and open access to the platform for alumni and working professionals, providing courses and resources for continuing skills development.

- **System ecosystem and operations upgrade: from independent operation to collaborative evolution.** Planned system upgrades include optimizing the hybrid cloud architecture to support large-scale online teaching and cross-institutional collaboration. The university also plans to strengthen security through AI vulnerability scanning and enhanced protection of sensitive data, while establishing a sustainable user feedback and rapid iteration mechanism to support continuous platform improvement.
- **Expanding industry impact: from campus application to model dissemination.** SZPU plans to develop standardized guidelines for intelligent TVET teaching platforms based on the project’s experience and provide technical consultation to peer institutions. The university intends to collaborate with industry partners and research institutions to develop domain-specific AI knowledge bases and teaching models for TVET in fields such as intelligent manufacturing, automotive technology and transport, strengthening education-industry integration and improving the platform’s relevance to different industry contexts.

Learn more

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To learn more about Shenzhen Polytechnic University, see:
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